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A midsummer journey through the coastal plain of the Carolinas and Virginia

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INTRODUCTION

In discussing the vegetation of the Atlantic coastal plain, a territory about ten times as long as wide, it becomes expedient to divide the region transversely into several districts of convenient size. For this purpose there are probably no better natural boundaries than the large rivers which rise in the highlands and cross the whole width of the coastal plain.* That portion between the James River and the Savannah, embracing the whole of the coastal plain of the Carolinas and about half that of Virginia, may conveniently be treated as a unit, since these two rivers seem to mark the divisions between perceptibly different parts of the coastal plain, and as far as known there is no other boundary of equal importance lying between them.

The Savannah River coincides pretty closely with the boundary between the topographically diversified and the comparatively monotonous portions of the coastal plain, as shown below, while the James seems to mark the northeastern limit of *Pinus palustris*, *P. serotina*, *Aristida stricta*, *Quercus Catesbaei*, and numerous other characteristic pine-barren plants. (There is, however, almost nothing on record about the flora of the coastal plain of Virginia north of the James River, doubtless chiefly because most of the counties in that part of the state have never had railroad facilities.) The James and its tributary, the Appomattox, are the southernmost rivers whose estuaries extend all the way across the coastal plain.

The region in question has been worked over more or less by botanists and other observers for 200 years or so, and there is consequently a considerable amount of information about the plants of that part of the country scattered through literature which may be roughly classified as follows:

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* A similar method has been employed by McGee (Ann. Rep. U. S. Geol. Surv. 12^1: 360-364. 1892) in discussing the topography, though his resulting districts do not coincide with mine.

1. Descriptive manuals, such as those of Elliott, Chapman, Wood, and Small, covering more than one state, making little or no distinction between the coastal plain and other natural regions, and containing no rational treatment of habitats.

2. Monographs of families or genera, or scattered descriptions of species, too numerous to mention.*

3. Works relating to trees primarily, such as Sargent's Tenth Census report,† Pinchot & Ashe on the trees of North Carolina,‡ Mohr's Timber Pines,§ and Bulletins 43 and 56 ‖ of the U. S. Bureau (formerly Division) of Forestry, on South Carolina.

4. State and local lists, lacking details of habitat or distribution, or both; such as Curtis on North Carolina, 1867, Croom on Newbern, 1837, and Wood & McCarthy on Wilmington, 1887.

5. Notes on selected species, or narratives of botanical expeditions, with few or no references to earlier workers in the same fields. Among these are Bartram's Travels, Michaux's Journal,¶ and several short semi-popular papers on Dismal Swamp and vicinity, most of which are cited in (and practically superseded by) Mr. Kearney's elaborate survey of that region.

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* For the Altamaha Grit region of Georgia about two years ago I could find less than a dozen works of this class, but the number for the Virginia-Carolina coastal plain would doubtless run into the hundreds.

† Vol. 9. 1884. The forests of the Carolinas are briefly described on pages 515–519, with four maps.

‡ Bull. 6, N. C. Geol. Surv. 1898.

§ Bull. 13, Division of Forestry, U. S. Dep. Agr. 1896. Revised 1897.

‖ Bulletin 56, on a working plan for forest lands in Berkeley County, by C. S. Chapman, was published early in 1906, and contains considerable interesting information which will be referred to farther on; but the list of trees and shrubs on pages 45 and 46 is so misleading that it should not be allowed to remain unchallenged. For example, the cypress is probably not all *Taxodium distichum*, and the "black gum" is almost certainly *Nyssa biflora* rather than *N. sylvatica*, which is rare in the coastal plain, especially in such flat country as that under consideration. The "titi" is doubtless *Cyrilla*, for it is too far north and east for *Cliftonia*. The "hurrah bush" must be *Pieris nitida* (which goes by a similar name in Okefinokee Swamp), for *P. floribunda* (*Andromeda*) is confined to the mountains, as far as known. The buckeye is in all probability *Aesculus Pavia*, and the "prickly ash" *Aralia spinosa*.

¶ Journal of André Michaux, 1787–1796. Edited by C. S. Sargent. Proc. Am. Phil. Soc. **26**: 1–145. 1889. Part of the same is reprinted in vol. 3 of Thwaites's "Early Western Travels," 1904.

6. Descriptions of the vegetation of restricted areas, with plants classified according to habitat in a scientific manner, like Kearney's reports on Ocracoke Island and Dismal Swamp in the fifth volume of the Contributions from the U. S. National Herbarium, and Coker's paper on the Isle of Palms, S. C.*

7. A number of primarily geological, geographical, descriptive, agricultural, ethnological and even ornithological works, in which plants are mentioned only incidentally and mostly by their common names, if at all, furnish valuable information to one familiar with the principles of plant distribution in the coastal plain, and should not be overlooked. Among the best of these are some of the early reports of the North Carolina Geological Survey by Emmons and Kerr, the reports on cotton production † by Kerr and Hammond in the 6th volume of the Tenth Census reports (1884), the soil surveys published by the U. S. Department of Agriculture during the present century ‡, the supplements to Redway & Hinman's geographies, on North Carolina by Cobb and on South Carolina by Glenn; and Water Supply and Irrigation paper no. 114 of the U. S. Geological Survey, which contains up-to-date though brief summaries of the present knowledge of the stratigraphy of the three states in question (by Darton, Fuller, and Glenn), as well as of all the other eastern states. (References to many other primarily geological works for each state, which are worth consulting, may be found in Bulletins 127, 188, 189, and 301 of the U. S. Geological Survey, which are bibliographies of North American geological literature from 1731 to 1905.)

But even yet, as may be inferred from the foregoing, the vege-

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*Torreya 5: 135–145. *f. 1–4.* 1905.

† Under this too modest title are concealed some of the best geographical descriptions of the southeastern states ever published, including among other things valuable notes on the native vegetation. The essential geographical features of all these cotton production reports, including the maps, are condensed into a little known pamphlet by Dr. Eugene A. Smith, reprinted from the 4th report of the U. S. Entomological Commission, pp. 59–80 and 2 maps. 1884.

‡ The soil survey reports hitherto published for the region in question are those of the Norfolk area, Virginia; Raleigh to Newbern, the Craven area, and Perquimans, Pasquotank, Duplin, and New Hanover counties, North Carolina; and the Darlington, Orangeburg, and Charleston areas, South Carolina. Others for each state are said to be in preparation. These reports, which contain excellent maps and other interesting matter, would be a little more satisfactory if their authors had taken advantage of some easily accessible earlier descriptions of the same regions.

tation of the Virginia-Carolina coastal plain is practically undescribed, except for the vicinity of Dismal Swamp, and two or three spots on the seacoast farther south. The geology of the region is also by no means as well known as one might wish, chiefly because of the scarcity of rock outcrops and the lack of diversity in the topography, as compared with the corresponding portions of the Gulf States.

NARRATIVE

With a view of gaining some knowledge of the region in question at first-hand, I made it a point on the way from Alabama to New York in July, 1906, to travel through the coastal plain most of the way, and to see as much of it as possible in the few days at my disposal. My principal objects in taking such a roundabout route were: first, to ascertain whether the Altamaha Grit formation, which I had just been studying in Georgia,* extended beyond the Savannah River into South Carolina; second, to see if the ranges of certain plants followed geological belts approximately parallel to the coast, as so many do in Georgia and Alabama; and third, to discover the northeastern limits of as many coastal plain species as possible, and the reasons therefor. What success was attained in solving these and other problems which presented themselves will appear in the following pages.

From the time I entered South Carolina by crossing the Savannah River a few miles below Augusta, until I reached Richmond on the banks of the James, five days later, I traveled entirely in the coastal plain, by daylight, and over railroads which were new to me (except the first and last 25 miles or so), so that new facts were gathered on nearly every mile of the journey. Every species recognizable from the car-window was noted as many times as possible (except in the case of a few of the commonest trees), and no botanizing was done on foot, except a very little near Charleston and Florence, S. C., and one afternoon on and near Wrightsville Beach, N. C.

Itinerary. — My itinerary through the three states was as follows: From Augusta to Yemassee and Charleston on the afternoon of July 25th, from Charleston to Florence, S. C., the next afternoon, from Florence to Wilmington, N. C., and Wrightsville Beach on the 27th, from Wilmington to Rocky Mount and Tarboro, N. C., and Norfolk, Va., on the 28th, and from Norfolk to Petersburg, Richmond and northward on the afternoon of the 30th. By this zigzag route I crossed the coastal plain several times while working gradually lengthwise of it, thus obtaining a broad view of it which could hardly be surpassed in so short a time. Augusta, Rocky Mount, Petersburg, and Richmond are fall-line cities, Charleston, Wilmington, and Norfolk are seaports, and Florence, at another of the angles of the route, is about two-thirds of the way from the coast to the fall-line. From Richmond to New York the rest of my way lay along the fall-line — the coastal plain between these points being so interrupted by bays and estuaries that one cannot travel far in it by rail — and this part of the route, which was already more or less familiar to me, was traversed in the dark.

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* See Torreya 6: 241–246. 1906.

Topography and geology. — The topography of the Virginia-Carolina coastal plain seems very simple and monotonous, as compared with that of Georgia, Alabama, and Mississippi. Slightly undulating near the fall-line, where the average altitude is about 300 feet, the relief, the general slope, and the elevation gradually and almost insensibly decrease toward the coast. Here there seem to be no sudden changes in the aspect of the country, such as are encountered at intervals in crossing the coastal plain almost anywhere between the Savannah and Mississippi Rivers, where the different geological divisions are so well marked by their topography and vegetation that it requires no knowledge of paleontology, and not a great deal of experience, to distinguish them.

On this journey of about 700 miles through three states I do not remember seeing any rocks, bluffs, escarpments, hills, ravines, gullies, springs, or hammocks, or passing through any railroad cuts deep enough to obstruct the view, unless perhaps a few near the fall-line. The flatness of most of this region (which is quite comparable in this respect with the coastal plain or southern portion of Long Island and the flat pine-barren region of Georgia) could easily be inferred, with the aid of a good map, from the straightness of the railroads. No curves were noticed in a distance of about 50 miles through Pender and Duplin counties, N. C., and there are probably other tangents of equal or even greater length in the same general region.*

One or two slight exceptions to the general monotony of the topography toward the coast may be worth noting. In the immediate vicinity of Yemassee, S. C., the country seems just a little more broken than it is for some distance farther inland; and the city of Wilmington is remarkably hilly for a southern seaport, perhaps more so than any other place so near the coast between New York and Florida. The topography between Wilmington and Wrightsville Beach, a distance of ten or eleven miles, seems as undulating as in many places in the Altamaha Grit region of Georgia,† and looking inland from the beach the land is seen to have a decided elevation, quite different from the extreme flatness which characterizes the coasts of South Carolina and Georgia. The exact cause of these local variations in topography is probably unknown, but it seems from the soil survey map of New Hanover County (published in February of this year) that Wilmington is on the sand-hills of the Cape Fear River, one of the largest rivers in the state, so this may partly account for its topography.

The flatness of the greater part of this coastal plain is evidently correlated with a state of affairs well known to geologists, namely, that the Cretaceous and Tertiary strata in Virginia and the Carolinas are much more nearly horizontal than they are farther west and south, so that Cretaceous rocks are exposed near Wilmington, and Miocene near the fall-line in all three states. This approach to horizontality seems to culminate in the latitude of Cape Hatteras, according to several geologists who have investigated it.

Ponds are seen at frequent intervals in the pine-barrens of South Carolina, less frequently in North Carolina, and rarely if at all in Virginia. As in Georgia, most of them seem too shallow to contain water throughout the year. In North Carolina, but scarcely in the other two states, are several large lakes, most of them not very far from the coast. The only one which I passed within sight of is Lake Waccamaw, in Columbus County, but Kerr ‡ mentions fifteen others. At present they do not seem to be as well known to botanists as they are to ornithologists, * but they should be most interesting places for ecological study.

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* See Glenn, Jour. School Geog. **2**: 91. 1898; also Bull. 43, U. S. Bureau of Forestry, *pl. 4–13*; and Torreya **6**: 41. 1906.

† See Bull. Torrey Club **32**: 145. 1905; Ann. N. Y. Acad. Sci. **17**: 23. 1906.

‡ Rep. Geol. Surv. N. C. for 1875, page 13.

The streams of the Virginia-Carolina coastal plain can be divided into two classes according to length, namely, the muddy, almost opaque, rivers which rise in the Piedmont region or in the mountains beyond, and the smaller coffee-colored streams which rise in the sandy and little eroded coastal plain. † Those of the former class which I crossed (between the Savannah and the James) are the Santee, Lynch's, and Peedee rivers in South Carolina, the Cape Fear, Neuse, Tar, Roanoke, and Chowan in North Carolina, and the Appomattox in Virginia. More will be said about some of these later. To the latter class belong the Salkehatchie or Combahee, Edisto, Black, and Lumber rivers in South Carolina, the Northeast Cape Fear in North Carolina, the Blackwater in Virginia, and all the creeks and branches.‡ None of the rivers seemed to have deep channels or well defined banks where I crossed them, being bordered on both sides by extensive swamps.‡

Unmistakable fluvial sand-hills § were seen only on the left sides of the Peedee, Lumber, and Blackwater rivers, and the right side of the Northeast Cape Fear opposite Castle Hayne; though there seemed to be a faint development of them on the left side of the Neuse near Goldsboro.|| The flora of all these areas appeared to be much less varied than that in similar situations in Georgia, where most of the known sand-hill species may be found.

As far as the geology is concerned I can add very little to what is already known of this region. In South Carolina, especially in Hampton County, I looked closely for evidences of the Altamaha Grit, but did not see any of the rock of this formation,¶ or even any of the characteristic topography, which is unmistak-

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* For some pretty good illustrations of one of them see T. G. Pearson, Bird-Lore 7: 121–126. 1905.

† A similar distinction was made nearly 200 years ago by Catesby in the appendix to the second volume of his "Natural History of Carolina."

‡ For definition of these terms, see Ann. N. Y. Acad. Sci. 17: 25. 1906.

§ See Ann. N. Y. Acad. Sci. 17: 25–27. 1906.

|| See in this connection Field Operations of the Bureau of Soils for 1900, page 200.

¶ This fact in itself, however, does not prove anything, for outcrops of it are very scarce even in Georgia (see Torreya 6: 245–246. 1906).

ably displayed in the adjoining county of Screven in Georgia.* In most of the railroad cuts in South Carolina, however, could be seen that red-and-white mottled loam which lies between the Grand Gulf and Lafayette formations in Alabama and Mississippi and seems to intergrade with the Altamaha Grit in Georgia.† Going northeastward from the Savannah River this mottled phase seemed to become gradually paler and more homogeneous, until by the time Virginia was reached it was no longer distinguishable from the Lafayette if it was present at all.

The Columbia sand seems to cover the greater part of the area examined, as has been shown by McGee ‡ and others, but rather thinly, except on the sand-hills along the fall-line and rivers, and the dunes along the coast. The Lafayette loam immediately underlying it is exposed over considerable areas up toward the fall-line, just as it is in the upper third of the coastal plain in Georgia and the greater part of the same province in Alabama.

Effects of civilization. — Some of the publications cited herein, particularly the reports on trees by Mohr and by Ashe,§ and the soil survey reports, describe the effects of civilization in the region under consideration, but as economic conditions are continually changing, a few more words on the subject may be of interest.

Those pioneer industries, turpentining and lumbering of long-leaf pine, are decidedly on the wane in the Carolinas, and will doubtless soon be practically at an end unless conservative methods are speedily and widely adopted. I do not remember seeing a single mature and round (*i. e.*, unboxed) long-leaf pine in either state, though this may be partly explainable by the fact that all the railroads I traveled on after leaving Georgia are comparatively old. Along the newer lines, and away from all railroads and streams, conditions should of course be a little better. *Pinus Taeda* now furnishes a large proportion of the pine lumber of the region, and is even being tapped in a few places for turpentine, but with what success I did not ascertain.

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* The formation may possibly occur in Beaufort County (the southernmost in South Carolina) for *Pinckneya*, *Cliftonia*, *Nyssa Ogeche*, and *Serenoa* have been found there, and apparently nowhere else in the state. (See Bull. Torrey Club 32 : 147. 1905.)

† See Ann. N. Y. Acad. Sci. 17 : 23; Torreya 6 : 241. 1906.

‡ Ann. Rep. U. S. Geol. Surv. 12^1 : 386–388. 1892.

§ Bulletins 5 to 7 of the North Carolina Geological Survey.

The proportion of cleared land in eastern Virginia and the Carolinas seems somewhat greater than in South Georgia, doubtless because these more northeasterly states have been settled longer, and because their shorter distance from the great centers of population makes truck farming more profitable than it is in Georgia. As in Georgia, the destruction caused by agriculture has been much greater outside of the pine-barren region than within it.* The density of population in the regions traversed (outside of the cities of course) ranged from about 20 to 40 inhabitants per square mile in 1900, and is probably very little greater at the present time, for the evidences of recent growth which are conspicuous all through the pine-barrens of Georgia, Alabama, and Mississippi † were scarcely noticeable in these older states.

Vegetation. — The study of the laws of distribution of vegetation in the coastal plain northeast of the Savannah River is by no means easy, especially as there is so little previous work to go by. The correlations between ranges of species and vegetation types on the one hand and the areas of various Tertiary formations on the other, which are so pronounced in Georgia and Alabama, seem to be very indistinct in the Carolinas, doubtless chiefly because of the flatness of the country and the approximate horizontality of the strata, already mentioned. Next to the water-content of the soil, which here of course depends mainly on the local topography, and historical development, which has to be taken into consideration everywhere, the present distribution of plants in the region under consideration probably depends on the extent and thickness of the Columbia sand as much as on any other one factor.

In general it may be said that between the Roanoke and Savannah rivers the pine-barrens proper ‡ extend about two-thirds of the way from the coast to the fall-line, and that in the remaining third (exclusive of the fall-line sand-hills) oaks and other angiospermous trees predominate, just as in the upper third of the coastal plain of Georgia. On the way from Augusta to Yemassee, although *Pinus palustris* can be seen in scattered groups or individuals nearly the whole distance,* the real pine-barrens only begin about the inland edge of Hampton County, and seem to terminate near its coastward edge.† Between Yemassee and Charleston the railroad passes mostly through the maritime or littoral region (very similar to that of Georgia ‡), where *Pinus palustris* is rare and *P. Taeda* common. Beyond Charleston the limits of the pine-barrens are less clearly defined.

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* This is pretty well shown by the maps in the Tenth Census reports showing the ratio between the area cultivated in cotton and the total area. On account of the prevalence of cleared land I was able to make comparatively few notes in such counties as Aiken, Barnwell, and Florence in South Carolina, and Wayne, Wilson, and all north of there in North Carolina.

† See Bull. Torrey Club **32**: 142. 1905; Torreya **6**: 200. 1906; Ann. N. Y. Acad. Sci. **17**: 120. 1906.

‡ See Bull. Torrey Club **32**: 452. 1905; Torreya **6**: 42. 1906; Ann. N. Y. Acad. Sci. **17**: 16. 1906.

The illustrations in Bulletins 43 and 56 § of the U. S. Bureau of Forestry give an excellent idea of the general appearance of the South Carolina pine-barrens, and the forests of the North Carolina coastal plain have been so well described by Mr. Ashe in Bulletins 5 and 6 of the North Carolina Geological Survey that it would be useless to attempt to improve on his observations with so little preparation; but there is still room for a few notes on the herbaceous vegetation, and for some statistics of distribution, which may serve as suggestions for future work in this region.

Pine-barren vegetation, if we may judge by the number of species in a given area, seems to center at present in Georgia and Florida,‖ and as a rule grows gradually poorer and less typical with increasing distance from this center, the proportion of older species from the highlands at the same time increasing, as I had excellent opportunity to observe on this trip. *Pinus Elliottii*, whose distribution in Georgia coincides almost exactly with the pine-barrens, extends only a short distance into South Carolina.¶ *Pinus*

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* In Georgia it seems to skip a good deal of the Eocene region. See Bull. Torrey Club 31: 15. 1904; 32: 456. 1905; Ann. N. Y. Acad. Sci. 17: 305. 1906.

† This is corroborated by Hammond's agricultural map of South Carolina in the Tenth Census report already cited, and by Glenn's physical outline map in his South Carolina supplement to Redway & Hinman's geography.

‡ See Ann. N. Y. Acad. Sci. 17: 20. 1906.

§ It should be observed that *plate 1* in Bulletin 56 is from the same photograph as *plate 12* in Bulletin 43, which purports to show *Pinus Elliottii* among other things, and therefore was not taken in Berkeley County.

‖ See Torreya 7: 43; Science II. 25: 540. 1907.

¶ For details see the latter part of this paper. In the other direction it is not *palustris*, which is preëminently the tree of the pine-barrens, very gradually gives way to *P. Taeda* northeastward, disappearing entirely before reaching the James River. In fact there are in the Carolinas some limited areas which might reasonably be called pine-barrens where the pines are all *P. Taeda*. * This is probably never the case within the range of *P. Elliottii*.

A notable exception to the general thinning out of the pine-barren vegetation northeastward is found in the southern corner of North Carolina, where *Pinus palustris* becomes again the prevailing pine, and the flora is perceptibly richer than it is a little to the southwest as well as to the north, with little if any corresponding increase in diversity of habitats. Some of the species characterizing this minor pine-barren center are enumerated below.

Within the pine-barrens the local diversity of the vegetation is of course governed mainly by the slight inequalities of the surface. The greater part of the area consists of dry and moist pine-barrens, the latter mostly occupying broad shallow depressions or nearly flat areas, rather than evident slopes as in the Altamaha Grit region of Georgia. The ponds of course contain their own characteristic flora, quite different from that of the moist pine-barrens. All the streams are bordered by swamps, the width of each of which is approximately proportional to the volume of the stream. As in all pine-barren regions, most of the angiospermous trees are confined to the vicinity of streams, and the swamps or rivers originating above the fall-line have quite a different flora from those of the pine-barren streams, as will be illustrated below in discussing the distribution and habitat of certain species.

Scattered through the flat parts of North Carolina, and to a lesser extent in adjacent territory, are many "pocosins." † These

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known to extend beyond Mississippi. (See Torreya 6: 200, 201. 1906.) *Serenoa serrulata*, *Quercus geminata*, *Cliftonia monophylla* and several other species have a similar distribution.

* Civilization has of course changed the relative abundance of these trees to some extent, but in making the statements in this paragraph I have tried to reconstruct the primeval conditions as far as possible.

† Often spelled "pocosons." The use of this term seems to be almost confined to eastern North Carolina, but it appears to some extent in other states, though with variations in meaning in different localities, as in the case of several other native habitat names, like swamp, hammock, prairie, bay, savanna, brake, etc. The northernmost record of such a word which I have come across is in York County, Virginia, where

are described or mentioned in nearly all works of a geographical nature dealing with the coastal plain of North Carolina, especially the publications of Emmons,* Kerr,† Ashe, ‡ and the U. S. Bureau of Soils, § but in all these descriptions unfortunately most of the plants are mentioned only by their common names, and nothing like a complete list of species is attempted. A pocosin may be briefly described as an extensive flat, damp, sandy or peaty area, supporting a scattered growth of pine (mostly *Pinus serotina*) and a very dense growth of shrubs, mostly evergreens, giving the whole a decided heath-like aspect — the term heath being used here in the sense of a certain type of vegetation || rather than as the name of a certain class of plants, though these shrubs are indeed largely of the Ericaceae and allied families. What the earlier and later stages of a pocosin may be, probably no one has ever determined; but this would be a most interesting subject for ecological study. Pocosins have no exact counterpart in Georgia, but in their vegetation, though not so much in topography, they much resemble some

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there is a settlement named Poquoson on a river of the same name. In South Carolina the term seems to be used in a somewhat different sense. John Lawson, in his "New Voyage to Carolina," published in 1709, speaks of "Percoarson, a sort of low Land," near the Santee River, containing cypress trees (which are not at all characteristic of the North Carolina pocosins), and the "pocosons" described by C. S. Chapman in Bulletin 56 of the U. S. Bureau of Forestry seem to be nothing more nor less than cypress ponds. (On the other hand, the "savannas" of these two writers correspond more nearly with pocosins as here understood.) Just as I was leaving Alabama on this same trip I heard of a "pocosin" in Pike County (Eocene region of the coastal plain) which from the description given must have been much like some of the hammocks of South Georgia and adjacent Florida (particularly those described by Croom in Am. Jour. Sci. **26**: 318. 1834). In Georgia, however, I have never found the slightest evidence of the use of such a word. It is a curious coincidence that while pocosins, like hammocks, are confined to the coastal plain, they do not seem to be known within the range of *Pinus Elliottii*. This is illustrated by the absence of the term from Georgia, Florida, and the Alabama pine-barrens, as far as known, and by Bulletin 43 of the U. S. Bureau of Forestry, which treats of a part of South Carolina not far distant from that described in Bulletin 56, but within the range of this pine. In this bulletin the word pocosin is not used, and no feature of that kind is even described.

* 2d Rep. N. C. Geol. Surv. (Agriculture of the eastern counties), page 38. 1858.

† Rep. N. C. Geol. Surv. for 1875; also report on cotton production in 6th vol. of Tenth Census, 1884.

‡ Bull. N. C. Geol. Surv. **5**: 17, 28, 34; **6**: 179–181.

§ Field Operations of the Bureau of Soils, **1900**: 36, 38, 204–205, *pl. 25*; **1903**: 269–270; **1905**: (in reports on Perquimans, Pasquotank and Duplin counties, not yet paged consecutively).

|| See Cowles, Bot Gaz. **27**: 367–369. *f. 24–26.* 1899.

of the sand-hill bogs of the Altamaha Grit region,* the low islands in Okefinokee Swamp, and some densely bushy places in the flat pine-barrens near the coast.

In the pine-barrens of Brunswick and Pender Counties, North Carolina, one occasionally passes extensive flat meadow-like areas, or savannas, with no shrubs and very few trees, recalling the "pine meadows" of southeastern Mississippi.† One such place near Burgaw ‡ contained no trees or even stumps in an area of several hundred acres, being a veritable prairie, and at the same time apparently perfectly natural. The vegetation of such places is composed chiefly of grasses (especially *Campulosus aromaticus*) and other monocotyledons, as might be expected.

Floristics. — The total number of species noted in the three states in five days was about 200, all seen and identified from the car windows except a few near Florence, S. C., on the morning of July 27, and about thirty in the vicinity of Wrightsville Beach, N. C., on the afternoon of the same day, which had not been observed from the railroads. Counting both native and introduced species, the monocotyledons constitute 25.7 per cent. of the angiosperms in my notes for this trip; while of the native angiosperms alone, the monocotyledons are 26.2 per cent. Although these figures are a little less than those I have obtained for several other coastal plain areas,§ the discrepancy is easily explainable by the fact that all the trees and nearly all the shrubs are dicotyledons, and my car-window notes are of course more complete for these than for the herbs. Considering the comparatively small number of species recorded, the correspondence seems remarkably close.

About 45 species noted in South Carolina were not seen after leaving that state, and some 15 others were evidently more frequent in South than in North Carolina. These 60 species, or the majority of them, can be divided into several groups according to habitat and origin, as follows:

First, plants of alluvial swamps along the larger rivers, a habitat which is evidently best developed in the Mississippi valley.* *Tecoma radicans*, *Bignonia crucigera*, *Fraxinus caroliniana*, *Hibiscus militaris*, *Gleditsia aquatica*, *Platanus occidentalis*, *Planera aquatica*, *Populus* sp., *Hicoria aquatica*, *Sabal glabra*. Most of these occur somewhere in North Carolina, but probably less abundantly. Thirty years ago Prof. L. F. Ward † commented on the absence of some of the same species from Dismal Swamp.

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* See Ann. N. Y. Acad. Sci. 17: *pl. 12. f. 2.* 1906.

† See Torreya **6**: 204–205. 1906; also McGee, Ann. Rep. U. S. Geol. Surv. 12^1: 368, 475. 1892.

‡ Described in Kerr's report for 1875 (pages 19, 178) as the "Burgaw Savannah."

§ See Torreya **5**: 207–210. 1906.

Second, plants chiefly confined to hammocks and allied habitats. *Polymnia Uvedalia*, *Batodendron arboreum*, *Vitis rotundifolia*, *Cercis canadensis*, *Magnolia grandiflora*, *Quercus virginiana*, *Fagus americana*, *Smilax lanceolata*, *Tillandsia usneoides*, *Juniperus virginiana*.

Third, plants of pine-barren ponds, a kind of habitat which, as already noted, seems to be more frequent in South Carolina than in the other two states. *Asclepias lanceolata*, *Sabbatia campanulata*, *Oxypolis filiformis*, *Ludwigia suffruticosa*, *Hypericum fasciculatum*, *Polygala cymosa*, *Castalia odorata*, *Pontederia cordata*, *Rynchospora corniculata*, *Panicum digitarioides*, *Taxodium imbricarium*, *Pinus Elliottii*.

Fourth, plants of fresh marshes and ditches, doubtfully indigenous. *Sambucus canadensis*, *Aeschynomene virginica*, *Juncus effusus*, *Lemna* sp., *Limnobium Spongia*, *Typha latifolia*, *Azolla caroliniana*.

Fifth, weeds, mostly from the tropics or with tropical affinities. *Eupatorium compositifolium*, *Ambrosia artemisiaefolia*, *Polypremum procumbens*, *Passiflora incarnata*, *Sida rhombifolia*, *Euphorbia maculata*, *E. eriogonoides*, *Bradburya virginiana*, *Glottidium vesicarium*, *Cyperus rotundus*, *C. Iria*, *Echinochloa colona*.

Of about 30 species seen in both Carolinas but not in Virginia, some belong to the same categories as those just mentioned, but the majority are typical pine-barren plants, which are rarely or never seen as far north as Virginia.

A very interesting group of plants comprises those noted oftener within about 50 miles of Wilmington than anywhere else on the whole journey. Several of these were not seen in South

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* See Ann. N. Y. Acad. Sci. 17: 74. 1906; Torreya 7: 44. 1907; Science II. 25: 541. 1907.

† Field & Forest 3: 29. 1877.

Carolina at all, though they nearly all grow in Georgia. The following is a somewhat incomplete list :[*]

Marshallia graminifolia (Walt.) Small.
Pterocaulon undulatum (Walt.) Mohr.
Aster squarrosus Walt.
Chondrophora nudata (Michx.) Britton.
Vernonia angustifolia Michx.
Sabbatia lanceolata (Walt.) T. & G.
Vaccinium crassifolium Andr.[†]
Rhexia Alifanus Walt.
Gordonia Lasianthus L.
Cyrilla racemiflora L.
Polygala ramosa Ell.
“ *lutea* L.
Amorpha herbacea Walt.
Aronia arbutifolia (L.) Pers.
Sarracenia flava L.
Sarracenia minor Walt.
Quercus cinerea Michx.
Myrica pumila (Michx.) Small.
Habenaria blephariglottis (Willd.) Torr.
Habenaria cristata (Michx.) R. Br.
Gyrotheca tinctoria (Walt.) Sal.
Smilax laurifolia L.
Lilium Catesbaei Walt.
Zygadenus glaberrimus Michx.
Tofieldia racemosa (Walt.) B. S. P.
Eriocaulon decangulare L.
Carex glaucescens Ell.
Dichromena latifolia Baldw.
Campulosus aromaticus (Walt.) Trin.
Aristida stricta Michx.

No attempt is made to include in this list any plants of dunes and marshes which were seen only at Wrightsville Beach, or any species whose apparently greater abundance in that vicinity was probably due only to the fact that I spent a few hours on the ground in New Hanover County, and nowhere else in North Carolina. The species listed here all grow in dry, intermediate or moist pine-barrens or in branch-swamps, and the reason for their frequency near Wilmington and comparative scarcity a hundred miles away in either direction is as yet obscure, though it is probably connected in some way with the geological peculiarities mentioned above. The fact that the vicinity of Wilmington is a sort of distribution center has been noticed before, by Kerr,[*] Gray,[†] and perhaps others, but apparently not yet explained.

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[*] See also Torreya 7 : 43, where are enumerated a few species apparently confined to this vicinity, none of which I happened to see on this trip.

[†] I saw this only once, in moist pine-barrens near Wrightsville. In the spring of 1794 Michaux found it near Wilmington, and 65 miles north of there. I have not come across any authentic published record of its occurrence outside of eastern North Carolina.

Another interesting though smaller group of plants includes those seen oftener in Virginia than in North Carolina. These happen to be all trees and shrubs,[‡] namely, *Oxydendrum arboreum*, *Aralia spinosa*, *Cornus florida*, *Rhus copallina*, *Quercus alba*, *Q. minor*, *Q. Phellos*, *Fagus americana* and *Pinus echinata*.[§] As I traveled 275 miles by rail through North Carolina (or about 295 including trip from Wilmington to Wrightsville Beach and back by electric cars), and only 137 in Virginia by daylight, traversed the whole width of the coastal plain in both states, and tried to note each species as often as possible, it is safe to assume from the returns that all these are at least twice as frequent in southeastern Virginia as in the corresponding parts of North Carolina.

The causes of their greater frequency in Virginia are doubtless somewhat complex, and need not be discussed here. An examination of their general distribution and habitats brings out some interesting points. In the coastal plain of Georgia and Alabama all these species grow on bluffs or in hammocks or bottom-lands, especially outside of the pine-barrens, and they evidently belong to a stage of vegetation much more nearly approaching the climax condition than does that of the pine-barrens.[||] They are all common in the northwestern portion of the coastal plain of Alabama, a region notable for the lack of diversity in its flora and the wide distribution of nearly all the species inhabiting it.[¶]

Some notes on the commoner species of the region traversed, and their habitats, may be of interest. The following were seen in all three states, and in most of the 25 or 30 counties in which notes were taken:

Eupatorium rotundifolium L. (intermediate pine-barrens, etc.).

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[*] Rep. Geol. Surv. N. C. **1875**: 106.

[†] Am. Jour. Sci. III. **28**: 336. 1884.

[‡] Probably mostly because herbs are relatively much less abundant and conspicuous (in natural plant-communities) outside of the pine-barrens.

[§] For notes on the occurrence of some of these in the vicinity of Dismal Swamp, see Ward, Field and Forest **3**: 30. 1877; Kearney, Contr. U. S. Nat. Herb. **5**: 404, 476–479. 1901.

[||] See Ann. N. Y. Acad. **17**: 103; Plant World **9**: 267. 1906.

[¶] See Torreya **7**: 45. 1907; also Mohr, Contr. U. S. Nat. Herb. **6**: 90. 1901.

Clethra alnifolia L. (pocosins and bushy pine-barrens).
Nyssa uniflora Wang. (creek- and river-swamps).
" *biflora* Walt. (along all streams, and in ponds).
Acer rubrum L. (creek-swamps mostly).
Liquidambar Styraciflua L. (nearly everywhere, but mostly small and scattered).
Liriodendron Tulipifera L. (branch-swamps and other low grounds).
Magnolia glauca L. (non-alluvial swamps and pocosins).
Quercus marylandica Muench. (dry woods and pine-barrens).
Alnus rugosa Koch (along branches mostly).
Salix nigra Marsh. (along creeks mostly).
Pinus Taeda L. (nearly everywhere).
" *serotina* Michx. (pocosins and other damp sandy places).
Taxodium distichum (L.) Rich. (creeks and rivers).

The following were also seen in all three states, but less frequently than those just mentioned:

Ilex glabra (L.) Gray (intermediate pine-barrens, etc.).
Phoradendron flavescens (Pursh) Nutt. (on *Nyssa biflora*).
Quercus digitata (Marsh.) Sudw. (dry woods, etc.).
" *Catesbaei* Michx. (dry pine-barrens and sand-hills).
" *Phellos* L. (low grounds).
Betula nigra L. (along creeks and rivers).
Myrica cerifera L. (bushy pine-barrens, and low grounds).
Spartina glabra Muhl. (salt marshes).
Pinus echinata Mill. (sand-hills and dry woods).
Anchistea virginica (L.) Presl (damp sandy places).
Pteridium aquilinum (L.) Kuhn. (intermediate pine-barrens, etc.).

NOTEWORTHY SPECIES

The following seem to deserve separate mention.

SENECIO TOMENTOSUS Michx.

Seen only along the railroad right-of-way, in Bertie, Hertford, and Gates counties, N. C., and Nansemond County, Va., where it was quite common. Mr. Kearney * noted its abundance in the same general region, and it was previously reported from the vicinity of Hampton, Va.,* and Elizabeth City, N. C.,† by Chickering, and near Weldon, N. C., by Ward; ‡ all these places being within 125 miles of each other. In Georgia it behaves quite differently, being chiefly confined to flat rocks; § and at the time it was described it was known only from Flat Rock, a large granite exposure in Kershaw County, S. C. This, together with the fact that it has not been reported from any natural habitat in the Dismal Swamp region, suggests that it may have been introduced there in comparatively recent times. More information about its distribution is greatly to be desired.

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* Contr. U. S. Nat. Herb. 5: 408, 472, 547. 1901.

ACANTHOSPERMUM AUSTRALE (L.) Kuntze

A few years ago ‖ I noted the gradual spread of this tropical weed northward along railroads in North Carolina. This time I saw it at several stations (*i. e.*, railroad stations) in the pine-barrens, then in Gates County, and finally across the state line in Nansemond County, Virginia. So it is now to be added to the flora of the Manual region.¶

LIMONIUM NASHII Small.

A plant which looks exactly like this species as I have seen it on the Georgia coast, and does not fit the description of *L. carolinianum*, was seen in considerable quantity just back of the dunes on Wrightsville Beach, N. C. It seemed to be the only *Limonium* there, and is doubtless the "*Statice Limonium?* (Masonborough)" of Curtis's catalogue,** and the *Statice caroliniana* of Wood & McCarthy's Wilmington Flora.†† *L. Nashii* has not been previously reported north of Georgia.

LUDWIGIA MARITIMA Harper, Torreya **4**: 163. *f. 2.* 1904.

I had seen no specimens of this from the Carolinas until I found it in the pine-barrens near Wrightsville, N. C. It was behaving suspiciously like a weed, as it and some of its congeners usually do in Georgia, and it may possibly be a comparatively recent (say within 200 years) mutation * from its nearest relative, *L. virgata* Michx.

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* Field and Forest **3**: 1. 1877; **3**: 152. 1878.

† Am. Nat. **7**: 523. 1873.

‡ Bot. Gaz. **11**: 38. 1886.

§ See Ann. N. Y. Acad. Sci. **17**: 42, 43, 134; Torreya **6**: 243, 244. 1906.

‖ Torreya **3**: 124. 1903.

¶ It has recently been reported as a waif in Lawrence, Mass., by E. S. Schneider in Rhodora (**9**: 26. 1907), but that of course has no special significance.

** Bost. Jour. Nat. Hist. **1**: 101. 1835. Masonboro is only a couple of miles from Wrightsville Beach.

†† Jour. Elisha Mitchell Sci. Soc. **3**: 109. 1887.

SASSAFRAS VARIIFOLIUM (Sal.) Kuntze, Rev. 574. 1891.†

Seen in Florence County, S. C., New Hanover and Wayne counties, N. C., and Prince George County, Va., but always as a weed ; and it is altogether probable that it is not native anywhere in the Carolina coastal plain, for its normal habitat seems to be on bluffs, which are very scarce in this region, as noted above.

GORDONIA LASIANTHUS L.

Pinchot & Ashe mention no particular localities in North Carolina for this tree, but I saw some small specimens, in flower, a little north and south of Magnolia ‡ in Duplin County, and perhaps also in New Hanover and Brunswick counties. On March 1, 1794, Michaux noted it near (old) Washington, 38 miles north of Wilmington, which must have been within ten miles of where I saw it. It was also reported from the vicinity of Newbern by Croom, and from near the present city of Washington, in Beaufort County, by McCarthy.§

HIBISCUS MILITARIS Cav.

Seen only in the muddy swamps of two of the rivers of the first class mentioned above, the Santee and Peedee, in Berkeley, Williamsburg and Florence counties, S. C. In Georgia likewise I have seen it only along two rivers of the same class, the Savannah and the Ocmulgee ; and in Alabama Dr. Mohr knew it only from the Alabama River and its connections in the coastal plain.||

ACER SACCHARINUM L. (*A. dasycarpum* Ehrh.)

If I am not mistaken I saw some specimens of this tree on the bank of the Roanoke River in Bertie County, N. C. It does not

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* See in this connection Ann. N. Y. Acad. Sci. **17** : 116. 1906.

† See Rusby, Nat. Stand. Dispensatory 1105, 1367. 1905 ; Henkel, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 89 : 62. 1906. Robinson, Rhodora **8** : 199. 1906.

‡ Could the name of the place perhaps have some connection with this tree ?

§ Bot. Gaz. **10** : 385. 1885 ; **12** : 78. 1887.

|| "Tennessee" in his remarks about this species (Contr. U. S. Nat. Herb. **6** : 617) is of course a typographical error for "Tensas."

seem to have been reported from eastern North Carolina before, but there is no known reason why it should not grow there, for in Georgia and Alabama it follows the larger rivers some distance down into the coastal plain.*

CYRILLA RACEMIFLORA L.

Seen a number of times, mostly in pocosins, in Columbus, Brunswick, New Hanover, Pender and Duplin counties, N. C., but nowhere else on this trip. I cannot imagine why I did not see it in South Carolina, for it is common in Georgia; or farther north than Duplin County, for it has been reported from Beaufort County, N. C., by McCarthy,† within a mile of the Virginia line by Michaux (February 23, 1794), and from Virginia by Ward ‡ and Heller. §

EUPHORBIA ERIOGONOIDES Small.

Observed in the outskirts of Florence, S. C., with *E. maculata*, in sand along a railroad track, which is just the usual habitat of both in South Georgia. In fact only two natural stations for *E. eriogonoides* are known, both in the Altamaha Grit region of Georgia.|| It has not previously been reported northeast of Georgia.

POLYGALA LUTEA L.

This has been mentioned above as one of the plants which is evidently more abundant in southeastern North Carolina than in adjacent territory. I might say further that I noted it thirty-one times (in seven counties) in North Carolina, and once in Virginia, but not once in South Carolina, though it is common enough in the pine-barrens of Georgia.

PLATANUS OCCIDENTALIS L.

The only object in mentioning this common tree here is to place on record something probably not generally known, namely, that in the pine-barrens of the Carolinas it seems to be confined

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* See Bull. Torrey Club **32**: 147. 1905; and Dr. Mohr's remarks on the same species.

† Bot. Gaz. **10**: 384. 1885; **12**: 78. 1887.

‡ Bot. Gaz. **11**: 38. 1886.

§ Bull. Torrey Club **21**: 23. 1894.

|| See Ann. N. Y. Acad. Sci. **17**: 212. 1906.

to the banks of the muddy rivers, just as in Georgia.* In the Carolinas I saw it only along the Santee, Peedee, and Tar rivers; but in Virginia, where the coastal plain vegetation is further advanced toward the climax stage, it occurs along some smaller streams.

SARRACENIA FLAVA L.

Occurs in moist pine-barrens, sometimes sparingly and sometimes abundantly, in Hampton, Berkeley, Williamsburg and Marion counties, S. C., and Columbus, Brunswick, New Hanover, Pender, Duplin and Edgecombe counties, N. C.; but nowhere in all this territory was it as large or as abundant as it usually is in Georgia. On this trip I did not see it at all in Virginia, though I looked specially for it all through that state. But when reporting it from Dinwiddie County a few years ago † I overlooked the fact that Croom ‡ had long before cited specimens from Southampton County, Va., which is southeast of where I last saw it in 1904, and a little northeast of where I first saw it in 1903.§ There seems to be as yet no record of it within twenty miles of Dismal Swamp.

NYMPHAEA FLUVIATILIS Harper, Bull. Torrey Club 33: 234. 1906

What looks just like this species was seen in the Santee River in South Carolina and in the Chowan in North Carolina. It was previously known only from Georgia, but there is no apparent reason why it should be confined to that state.

MAGNOLIA GRANDIFLORA L.

Noted only twice in Barnwell County and once in Berkeley County, S. C. Mr. McCarthy ‖ reported it from the vicinity of Washington, N. C., but this is probably an error, unless it refers to cultivated specimens.

MAGNOLIA GLAUCA L.

Common in most of the counties passed through, in all three states, but never growing very large. In low pine-barrens and pocosins, especially in Hampton and Williamsburg counties, S. C., and Columbus, Brunswick, New Hanover, Pender, Duplin, Wayne and Edgecombe counties, N. C., it is represented chiefly by low bushes, often very abundant, just as in many places in the Altamaha Grit region of Georgia.* Arborescent specimens were also seen in non-alluvial swamps in Columbus, Brunswick, Edgecombe and perhaps other counties.

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* See Bull. Torrey Club **32**: 147. 1905.

† Torreya **4**: 123. 1904.

‡ Ann. Lyc. N. Y. **4**: 103. 1837.

§ See Torreya **3**: 123. 1903.

‖ Bot. Gaz. **10**: 384. 1885.

PLANERA AQUATICA (Walt.) Gmel.

Observed only in the swamps of the Santee, Black and Peedee rivers, in Berkeley, Williamsburg, Florence and Marion counties, S. C. (Michaux noted the same species on the Santee River, a little higher up than where I crossed it, on April 20, 1795, and April 10, 1796.) Its habitat is thus much like that of *Platanus occidentalis*, though its distribution is quite different in one respect, for it is very nearly confined to the coastal plain, but not altogether to the largest streams. It is one of those species which seems to center in the Mississippi embayment of the coastal plain, and does not extend as far northeast as Virginia.†

QUERCUS CATESBAEI Michx.

I noted this tree in most of the counties passed through southwest of Goldsboro, N. C., and then did not see it again until I passed the sand-hills of the Blackwater River near Zuni, Isle of Wight County, Virginia (half way between Norfolk and Petersburg), where it seems to be quite abundant, though of small size. As I was traveling about 40 miles an hour at the time, and secured no specimens, some persons may be reluctant to admit it to the flora of the "Manual region" without more evidence. I notice however that Pinchot & Ashe report it from Gates County, N. C. (one of the northern tier of counties), which would lead one to expect it in Virginia, even though their map of its range does not correspond with this statement.

FAGUS AMERICANA Sweet

This common tree was seen only a few times in South Carolina and Virginia, and not at all in North Carolina. This is not

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*See Ann. N. Y. Acad. Sci. **17**: 59, 239, 333. 1906. Its dimorphism as to size has also been briefly mentioned by Pinchot & Ashe.

†See Ann. N. Y. Acad. Sci. **17**: 246; Bull. Torrey Club **33**: 534. 1906; Torreya **7**: 44; Science II. **25**: 541. 1907.

surprising, however, considering its distribution in the coastal plain of Georgia.*

POPULUS DELTOIDES Marsh., and HICORIA AQUATICA (Michx. f.) Britton

These were noted only in the swamps of the Santee and Peedee rivers, like *Hibiscus militaris*. The *Populus*, like *Platanus*, is not known in the Altamaha Grit region of Georgia at all, while the *Hicoria* has a distribution much like that of *Planera*.

MYRICA CERIFERA L.

This was seen in three counties in South Carolina, four in North Carolina, and three in Virginia, and about three times in each, on the average; while its near relative *M. carolinensis* Mill. was noted only once, in a bog near Wrightsville, New Hanover County, N. C. Mr. Kearney scarcely mentions *M. cerifera* in his botanical survey of the Dismal Swamp region, but he appears to have partly confused the two species, as many others have done. Of the numerous references to *M. carolinensis* in his report, those on pages 370–372, 377, 386, 390, 392, 540 and 545 are doubtless correct, while those on pages 382, 400, 404, 473 and 477 almost certainly pertain to *M. cerifera*. The two species look much alike, but when their habitats are considered there is little danger of confusing them. *M. carolinensis* is distinctly a pioneer plant, growing in rocky pastures and barrens in the glaciated region, on dunes on the Middle Atlantic coast, and in sandy bogs in the coastal plain and lower mountains southward; while *M. cerifera* is much more of a climax plant, normally inhabiting hammocks, bluffs, etc., in the coastal plain from Maryland southward. The two species must have had a very different history. *M. carolinensis* is probably losing ground nearly everywhere, like most pioneer plants,† while *M. cerifera*, like several other species whose ranges extend into the tropics,‡ is doubtless tending to spread in the pine-barrens, if not elsewhere. In Georgia *M. cerifera* especially favors those rich spots where the Lafayette formation is absent (in this too it behaves like several other subtropical species);* but away from this main pine-barren center it is not so particular.

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* See Bull. Torrey Club 32: 147. 1905; Ann. N. Y. Acad. Sci. 17: 106, 330. 1906.

† See Bull. Torrey Club 33: 528. 1906.

‡ Such as *Andropogon tener* and *Pinus Elliottii*. See Ann. N. Y. Acad. Sci. 17: 301–302, 305–306. 1906.

The following references to places where the ranges, habitats or morphological characters of these plants are described may be helpful.

M. CERIFERA.
- Curtiss, Gard. and For. **1**: 280. 1888.
- Sargent, Gard. and For. **7**: 474–476. 1894; Silva N. A. **9**: 87–90. 1896.
- Lloyd & Tracy, Bull. Torrey Club **28**: 74 (as *M. Gale*), 91. 1901.
- Northrop, Mem. Torrey Club **12**: 32, 91. 1902.
- Coker, Torreya **5**: 140–144 (as *M. carolinensis*). 1905.
- C. S. Chapman, U. S. Forestry Bull. 56: 8, 10, 12. 1906. ("Wax myrtle.")
- A. H. Moore, List of plants collected in Bermuda. 8. 1906.
- Ann. N. Y. Acad. Sci. **17**: 15, 103, 106, 110, 111, 252. 1906.
- Max Rothkugel, Forestry Quarterly **5**: 3. 1907. ("Myrtle.")

M. CAROLINENSIS.
- Treat, Gard. and For. **1**: 494 (*M. cerifera*). 1888.
- Sargent, Gard. and For. **7**: 474, 477. 1894; Silva N. A. **9**: 84. 1896.
- Harshberger, Gard. and For. **5**: 45–46. 1892; Proc. Acad. Nat. Sci. Phila. **1900**: 643, 646, 649, 653; **1903**: 354; **1904**: 604 (as *M. cerifera*).
- Hollick, Bull. N. Y. Bot. Gard. **2**: 394, 395. 1902.
- Snow, Bot. Gaz. **34**: 294, 296, 298, 301, 305. 1902 (as *M. cerifera*).
- Blankinship, Rhodora **5**: 128 (as *M. cerifera*). 1904.
- Chrysler, Rhodora **7**: 123, 125, 127. 1905.
- Rhodora **7**: 74. 1905; Bull. Torrey Club 33: 528. 1906; Ann. N. Y. Acad. Sci. **17**: 55, 90, 91, 252. 1906; Torreya **6**: 214. 1906.

JUNCUS SCIRPOIDES COMPOSITUS Harper, Bull. Torrey Club **33**: 233. 1906

Unmistakable specimens of this were seen in rather dry pine-barrens near Wrightsville, N. C. This discovery extends its known range eastward about 200 miles, and northward about 150, if the artificial station near Aiken, S. C. (cited in the original description), be disregarded.

JUNCUS BIFLORUS Ell. (See Bull. Torrey Club **33**: 232. 1906)

Found in very nearly the same place as the preceding, which gives an authentic record in North Carolina for this neglected species.

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* See Ann. N. Y. Acad. Sci. **17**: 112, 191, 337.

TILLANDSIA USNEOIDES L.

Common nearly all the way through South Carolina, especially in Colleton and Berkeley counties; but much rarer in North Carolina, where I saw it in only five counties, and only once in each. Last noticed near the Roanoke River in Halifax County.

RYNCHOSPORA SEMIPLUMOSA Gray

In rather dry pine-barrens near Wrightsville, N. C. Not previously reported northeast of Georgia.

PINUS PALUSTRIS Mill.

It seems almost superfluous to add anything to what Mohr, Pinchot and Ashe have already written about this important tree in their well-known bulletins, cited above, but I might say that I observed it in every county passed through in the Carolinas except Charleston, S. C., and Nash, N. C. (I have very few notes, though, from these two counties). It becomes very scattered toward its northern limit, however, and I did not see it in Virginia at all. In fact, I know of no one who has seen it in that state in the last decade or two.*

PINUS ELLIOTTII Engelm.

The range of this in South Carolina is very limited, and I saw it only in Hampton County and near the borders of the adjoining counties of Barnwell and Colleton. It perhaps does not grow within thirty miles of Charleston. Many notes on its occurrence in Hampton and Beaufort counties can be found in Bulletin 43 of the U. S. Bureau of Forestry, under the name of "Cuban pine."

PINUS TAEDA L.

This is undoubtedly at present the commonest tree of the whole region, having been seen nearly every mile of the way, in every county passed through, in all three states. It varies considerably

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*Michaux, traveling southward along the fall-line on February 24, 1794, first encountered this tree six miles south of the Virginia-North Carolina boundary and ten from Halifax. But Kerr, in his report on the cotton production of Virginia (Tenth Census U. S. **6**: 635–637. 1884), mentions its former occurrence in Nansemond and parts of Isle of Wight, Sussex and Prince George counties. Croom has some interesting notes on this species on pages 47 and 48 of his flora of Newbern and vicinity. See also Kearney, Contr. U. S. Nat. Herb. **5**: 398, 406, 449. 1901.

in abundance, being apparently most abundant where *P. palustris* is least so (in Virginia and the upper third and lower tenth of the coastal plain of South Carolina, for instance), and vice versa.

PINUS SEROTINA Michx.

In the Carolina coastal plain this tree is almost as frequent as *P. Taeda*, though generally much less abundant. In a few places, however, particularly around Ashton, in Pender County, N. C., it is almost the only pine in sight over a considerable area. It is much more particular as to habitat than *P. Taeda*, being chiefly confined to pocosins and other sandy bogs, and avoiding the least trace of alluvium.

On this trip I saw a good deal of it in Nansemond County, Virginia, as in 1903,* and a little in Sussex County and perhaps a specimen or two in Chesterfield. In the northern edge of Dismal Swamp, along the N. & W. Ry., a few miles east of Suffolk, are many individuals at least a foot in diameter and forty feet tall.

I did not notice until very recently that Mr. Ashe † mentioned the occurrence of this species in Virginia long before I did, but in such an inconspicuous way that it has been overlooked by nearly every subsequent writer. An interesting problem which still awaits solution is to determine how far north *P. serotina* really extends, and whether it overlaps or intergrades with its nearest relative *P. rigida*.

TAXODIUM IMBRICARIUM (Nutt.) Harper

Noted in six counties in South Carolina (especially in Barnwell, Hampton and Williamsburg), but in only two in North Carolina (Columbus and New Hanover). It is common in places along the car line between Wilmington and the beach, where some specimens fully a foot in diameter and forty or fifty feet tall were observed; so it seems strange that Wood & McCarthy knew it from only one spot in that county. After leaving Wilmington I did not see any more of this tree, strange to say, unless a few specimens in the northern edge of Dismal Swamp, which I did not get a good look at, should prove to be of this species. Authentic records of it farther north than Wilmington are not wanting, however, for Croom reported it from the vicinity of Newbern, and from Drowning Creek, 32 miles southwest of Fayetteville,* which must be almost exactly where I saw it in 1905.†

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* See Torreya 3: 122. 1903.

† Bull. N. C. Geol. Surv. 5: 15, 31. 1894. See also Kearney, Contr. U. S. Nat. Herb. 5: 483. 1901.

CHAMAECYPARIS THYOIDES (L.) B.S.P.

This tree is evidently much more local in distribution than is commonly supposed, for I did not see a single specimen between Tuscaloosa and New York (a distance of 1900 miles by the route I took), though I was in or near its supposed range the whole distance. To determine and explain its exact distribution would be a most interesting problem.‡

SELAGINELLA ACANTHONOTA Underw.

Seems quite abundant on the sand-hills of the Lumber River in the northern corner of Horry County, South Carolina. Not previously reported from that state. Ordinarily one could not be sure of the identity of such a small plant when viewing it from a moving train, but as I had seen it under similar circumstances in Georgia just a week before,§ and its habitat at the new station was the same as it usually is in Georgia, ||I had very little doubt on that score. Having been discovered in North Carolina ¶ and collected several times in Georgia, there was no reason why this species should not turn up in South Carolina.

COLLEGE POINT, NEW YORK.

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* Am. Jour. Sci. **28**: 166. 1835.

† See Torreya **6**: 42. 1906.

‡ The following references to notes on its local distribution may be of interest: Torreya **3**: 122. 1903; **6**: 43. 1906; **7**: 43. 1907. Also Croom, Am. Jour. Sci. **26**: 316. 1834.

§ See Torreya **6**: 245. 1906.

|| See Bull. Torrey Club **32**: 152. *f. 3;* Fern Bull. 13: 15. 1905; Ann. N. Y. Acad. Sci. 17: 309. *pl. 28.* 1906.

¶ The type locality is near Wilmington, presumably on the sand-hills of the Cape Fear River. This is undoubtedly the "*Lycopodium rupestre*" of Curtis's flora of Wilmington, and probably the "clusters of moss" mentioned in the soil survey of New Hanover County (p. 19) as a characteristic feature of the sand-hills.